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## **THE NET GENERATION ENTERS UNIVERSITY: WHAT ARE THE IMPLICATIONS FOR TECHNOLOGY ENHANCED LEARNING?**

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### **Summary**

*The term Net generation suggests that the generation of young people born after 1983 are different from any preceding generation because they have been exposed to digital technology in their day-to-day existence, and that this has a profound impact on their attitudes and approach to learning.*

*Examining the use of the terms Net generation and Digital Natives this paper reports a survey of first year undergraduate students in the UK. This paper, based on research conducted in the spring of 2008 examines whether there is a distinct Net generation amongst first year UK university students and if there are significant differences attributable to age, gender or disciplinary differences.*

*It concludes that whilst there are significant changes taking place amongst first year undergraduate students in the UK they are far more complex than the idea of a single new generation would suggest.*

### **Introduction**

Tapscott (1998 and 2008) claims that the Net generation of young people born after 1983 are different from any preceding generation because they have been exposed to digital technology in their day-to-day existence, and that this has a profound impact on their attitudes and approach to learning. Tapscott argues that the changes in technology lead to inevitable consequences for learning and that education will need to move from a teacher-centered approach to learning to learner centered approaches.

A related argument using the term Digital Natives has also had broad influence in educational thinking (Prensky 2001 and 2001a). Prensky argues that digital natives are part of a process of discontinuous change:

One might even call it a “singularity” – an event which changes things so fundamentally that there is absolutely no going back. (Prensky 2001 p 1)

Prensky argued that in education there is a disconnection between the 'digital native' students and the 'digital immigrant' staff who retain the 'accent' of the pre-digital era. In a recent article Prensky has suggested that the distinction between digital natives and immigrants will become less important (Prensky 2009). Nevertheless both Prensky and Tapscott argue that the changes in technology have led to a generational break.

A recent UK report commented that: "Students are 'digital natives' – having grown up with ICT and expect to use their own equipment at university."(JISC 2008 p7). This opinion is not universally held and other researchers have pointed to some notable variations within this generation of students.

"In terms of how academic information searching was patterned according to students' background characteristics, some notable differences between students were also apparent ... For example, female students were significantly more likely than male students to report looking for information about university studies/assignments... Conversely – and just as importantly – no significant differences were discernable in terms of students' ethnic background, age, year of study or educational background in terms of A-level grades. Perhaps the most notable differences were in terms of subject discipline.(Selwyn 2008 p17 -19)

This paper examines whether there is a distinct Net generation amongst first year UK university students and if there are significant differences attributable to gender or disciplinary differences. Elsewhere we report items related to collaboration and the use of social networking (Jones and Ramanau 2009) and these findings suggested that a more detailed analysis of gender and discipline were warranted.

### ***The Research***

The research is the first phase of a two year project which took place in the spring of 2008 in five universities in the UK. The universities were selected to include the main 'types' of university in England. Fourteen courses were surveyed representing a range of subject and disciplinary areas. A questionnaire was developed by the research team to collect baseline information about key aspects of the students' use of technology in their studies. It consisted of four sections: demographic characteristics of the respondents, access to technology, use of technology in university studies in general and course-specific uses of technology.

Course registration was a maximum of 1809 students and a total of 596 students completed the survey yielding a response rate of approximately 33%. A further 62 responses were excluded because students had either failed to finish the survey form or had not signed the consent sheet.

Students were usually invited to participate during a short presentation by a member of the project team or university teaching staff (delivered at the start or end of a lecture or practical session). Distance students (University C) were sent an email and letter in place of the introductory presentation. Following this initial contact, follow-up emails were sent to all students on each course and some verbal reminders were given in subsequent lectures.

Three versions of the survey were produced:

- an online version accessible via the internet;
- a paper version for distribution and collection within a teaching session;
- a paper version for distance learners that could be mailed to their home and returned in a prepaid envelope.

These sources of data were then merged. Table 1 summarizes key demographic characteristics of the respondents by university.

Table 1. Key Demographic Characteristics (% of the total)

	University A	University B	University C	University D	University E	Overall
Male	22.3	27.3	36.1	43.2	16.3	27.8
Female	77.7	72.7	63.9	56.8	83.7	72.2
UK Students	96.6	95.3	93.3	80.8	98.0	93.9
Non-UK Students	3.4	4.6	6.7	19.2	2.0	6.1
18-25 years	96.0	89.1	12.6	95.9	84.4	75.8
Above 25	4.0	10.9	87.4	4.1	15.6	24.2
Full-time	99.4	96.9	5.1	100.00	99.0	80.3
Part-time	0.6	3.1	94.9	0	1.0	19.7
Total	176	128	119	74	99	596

To explore the differences across groups of respondents the sample was split into two age groups: students aged 25 years of age and younger and students aged older than 25 years of age. To analyse cross-disciplinary differences all 14 courses were split into four groups according to Biglan's (1973) classification. Courses in English, Sociology, Arts were classified as pure soft disciplines (218 respondents or 36.6 percent of the sample); Social Work, Journalism, Psychology and Information Management and Health and Social Care students applied soft (186 students or 31.2 percent of the sample); Computing, Science and Bioscience courses as pure hard (95 students or 15.9 percent of the sample and Accounting and Finance and Veterinary Sciences as applied hard (97 students or 16.3 percent of the sample).

### **Findings**

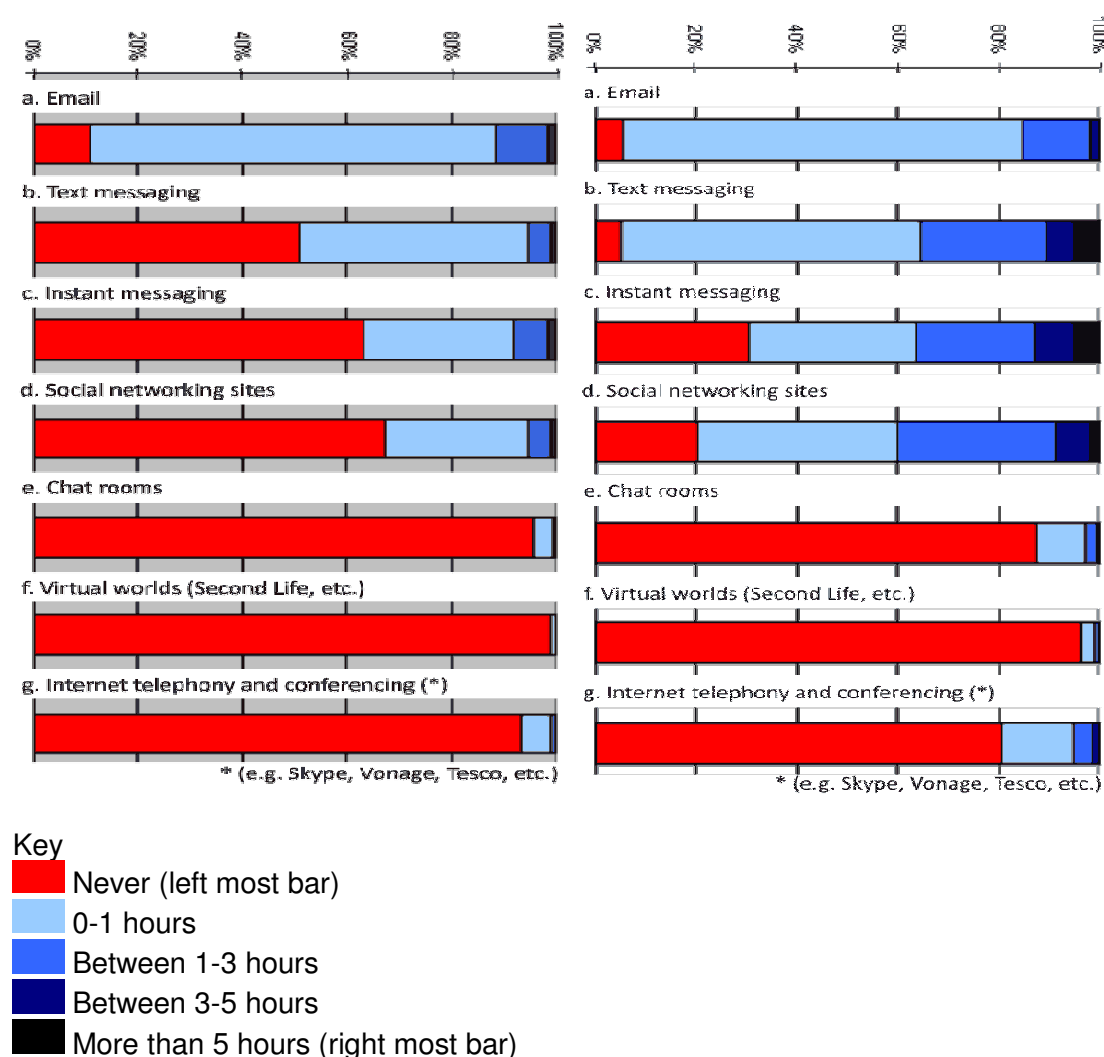
Over three quarters (77.4%) of the respondents owned a laptop and over a third (38.1%) owned a desktop computer. Very few (0.4% n=2) had no access to a desktop computer and only slightly more (1.4% n=8) no access to a laptop. Over two thirds (70.1%) felt that their access to computers was sufficient to meet their computing needs whilst a further 26.4% said it mostly meet their needs. Students aged 25 years of age and under were more likely to own a laptop ( $\chi^2 = 26.52$ , d.f. = 1,  $p < .001$ ) and students aged older than 25 years of age reported higher levels of desktop ownership ( $\chi^2 = 31.03$ , d.f. = 1,  $p < .001$ ). Male students were more likely to own a desktop ( $\chi^2 = 18.94$ , d.f. = 1,  $p < .001$ ), while a larger proportion of female students reported owning a laptop ( $\chi^2 = 13.87$ , d.f. = 1,  $p = .003$ ). When variations across gender groups were taken into account, the differences in laptop or desktop ownership were significant among the Net Generation students ( $\chi^2 = 21.81$ , d.f. = 1,  $p < .001$  and  $\chi^2 = 8.86$ , d.f.=1,  $p = .003$ ), but not among older students ( $\chi^2 = 0.81$ , d.f.=1,  $p = 0.48$  and  $\chi^2 = 0.46$ , d.f.=1,  $p = 0.29$ ). Students in pure hard sciences were more likely to own a desktop ( $\chi^2 = 18.71$ , d.f. = 3,  $p < .001$ ) and students in hard applied sciences – a laptop ( $\chi^2 = 13.87$ , d.f. = 3,  $p = .003$ ).

Respondents were asked how important Internet access was for a variety of activities and the activities rated most important were accessing materials and communicating rather than downloading and uploading materials. This suggests that the idea that the Net generation are more likely to be inclined to participation might be somewhat exaggerated. Examining the item accessing course information there appeared to be differences between age group ( $\chi^2 = 36.82$ , d.f.=2,  $p < .001$ ), and gender ( $\chi^2 = 20.56$ , d.f.=2,  $p < .001$ ), but not across academic disciplines ( $\chi^2 = 8.12$ , d.f.=6,  $p = \text{n.s.}$ ). However, regarding access to study materials the differences across age ( $\chi^2 = 57.97$ , d.f.=2,  $p < .001$ ), gender ( $\chi^2 = 12.07$ , d.f.=2,  $p = .002$ ) and academic disciplines were at statistically significant levels ( $\chi^2 = 21.99$ , d.f.=6,  $p = .001$ ).

Younger students regarded the Internet to be important for downloading/ streaming written material ( $\chi^2 = 58.06$ , d.f.=2,  $p < .001$ ), downloading/ streaming audio material ( $\chi^2 = 27.88$ , d.f.=2,  $p < .001$ ), downloading and streaming TV and video ( $\chi^2 = 34.32$ , d.f.=2,  $p < .001$ ), uploading materials ( $\chi^2 = 40.72$ , d.f.=2,  $p < .001$ ), and keeping in touch with other students and friends ( $\chi^2 = 1.18$ , d.f.=2,  $p < .001$ ). The differences across subject were also significant – students in hard applied disciplines were more likely to regard the use of Internet to be important for downloading/ streaming written material ( $\chi^2 = 21.56$ , d.f.=6,  $p = .001$ ), and TV and video ( $\chi^2 = 17.90$ , d.f.=6,  $p = .01$ ), and keeping in touch with students and friends ( $\chi^2 = 27.01$ , d.f.=6,  $p < .001$ ), than students in other subject areas . Students in pure hard disciplines were more likely to consider downloading/ streaming audio material ( $\chi^2 = 27.90$ , d.f.=6,  $p = .01$ ), and uploading materials ( $\chi^2 = 18.86$ , d.f.=6,  $p = .01$ ), to be important . Gender differences appeared to be significant only on the item relating to using the Internet for keeping in touch with other students and their friends ( $\chi^2 = 10.90$ , d.f.=2,  $p = .004$ ) and female students were more likely to consider this to be important.

Kennedy et al (2008) have made a distinction between what they called technologies for life and technologies for learning. In section 3 of the survey the participants were asked to estimate the amount of time that they spent doing various ICT-related tasks per day for social life and leisure and for study purposes using a 5-point Likert scale. (Figure 1).

Figure 1. Study purposes (left) social life and leisure (right)



There are a small minority of students who report never using email for study purposes and a similar small minority who never use email for social purposes. When cross-tabulated only 3 individuals never use email for either study purposes or social life and leisure but 42 cases report low use of either email for study purposes (21 at 0-1 hour a day) or for social and leisure purposes (21 at 0-1 hour a day). It suggests that there are a minority of students for whom email is not heavily used. The use of Virtual Worlds is at a very low level as is the use of Internet telephony and chat rooms.

In relation to the use of technology for social purposes students aged 25 years of age and under tended to use text ( $F(1, 582) = 58.84, p < .001$ ) and instant messaging ( $F(1, 582) = 101.31, p < .001$ ), social networking sites ( $F(1, 582) = 159.28, p < .001$ ) and Internet telephony and conferencing ( $F(1, 585) = 8.54, p = .004$ ) more than older students. But there were no significant differences across the two age groups in terms of the frequency of daily use of e-mail, chat rooms and Virtual Worlds. There were fewer differences across genders – female students used text messaging ( $F(1, 584) = 10.98, p = .001$ ) and social networking sites more often ( $F(1, 579) = 8.39, p = .004$ ). There were also subject differences in the use of text, instant messaging and social networking sites ( $F(3, 584) = 4.52, p = .004$ ; ( $F(3, 584) = 7.93, p < .001$ ) and ( $F(3, 579) = 10.13, p < .001$  respectively) with students in soft applied subject tending to report more frequent use.

For study purposes students aged 25 years of age and younger used e-mail ( $F(1, 586) = 21.05, p < .001$ ) text messaging ( $F(1, 582) = 29.49, p < .001$ ), instant messaging ( $F(1, 580) = 43.63, p < .001$ ) and social networking sites ( $F(1, 578) = 21.06, p < .001$ ) more frequently than older students. However, there were no differences in the use of chat rooms, virtual worlds and Internet telephony and conferencing. Gender differences were a little more pronounced. Female students tended to make more frequent use of e-mail ( $F(1, 588) = 3.92, p = .05$ ), text messaging ( $F(1, 584) = 12.67, p < .001$ ) and social networking sites ( $F(1, 580) = 6.47, p = .01$ ) than male students (test results). As with social purposes, students in soft applied subjects were more likely to use text ( $F(3, 588) = 7.36, p < .001$ ), instant messaging ( $F(3, 584) = 12.67, p < .001$ ) and social networking sites ( $F(3, 582) = 4.31, p = .01$ ), but they also used e-mail ( $F(3, 580) = 7.03, p < .001$ ) more than other students.. When gender group membership and subject affiliation were used as the covariates, age differences still appeared to be statistically significant at the .001 level.

Respondents were asked to assess their skill levels in terms of using various computer technologies and applications on the scale from 1 (minimal skill) to 5 (excellent skill level) (see Table 3 for item means). Students aged 25 years of age and under were more confident of their skills in all of the ICT tasks and gender differences were less salient. Male students were more confident than female students in their use of spreadsheets, graphics, audio/video, computer maintenance and computer security. Cross disciplinary differences also appeared to be less pronounced with differences in self-reported skills levels on only five out of nine tasks (see Table 3)

Table 3. Self-Reported Skill Levels in Key ICT Tasks (Item Means, 5-point scale).

	Gender		Age		Discipline			
	Male	Female	25 and under	Over 25	Pure Soft	Pure Applied	Pure Hard	Applied Hard
Spreadsheets	3.27 <sup>a</sup>	2.79 <sup>a</sup>	3.08 <sup>a</sup>	2.42 <sup>a</sup>	2.71 <sup>b</sup>	2.96 <sup>b</sup>	3.17 <sup>b</sup>	3.07 <sup>b</sup>
Presentation software	3.41	3.29	3.62 <sup>a</sup>	2.36 <sup>a</sup>	3.12 <sup>a</sup>	3.58 <sup>a</sup>	3.04 <sup>a</sup>	3.54 <sup>a</sup>
Graphics	2.48 <sup>a</sup>	2.04 <sup>a</sup>	2.29 <sup>a</sup>	1.72 <sup>a</sup>	2.13	2.19	2.23	2.07
Video/Audio	2.01 <sup>a</sup>	1.59 <sup>a</sup>	1.81 <sup>a</sup>	1.39 <sup>a</sup>	1.71	1.77	1.76	1.53

Online library resources	2.99	3.14	3.32 <sup>a</sup>	2.38 <sup>a</sup>	3.10b	3.28b	2.67b	3.15b
Computer maintenance	3.56 <sup>a</sup>	2.86 <sup>a</sup>	3.28 <sup>a</sup>	2.32 <sup>a</sup>	2.90	3.12	3.28	3.03
Computer security	3.27 <sup>a</sup>	2.50 <sup>a</sup>	2.86 <sup>a</sup>	2.25 <sup>a</sup>	2.55c	2.73c	3.06c	2.71c
Writing and commenting on blogs and Wikis	2.54b	2.22b	2.53 <sup>a</sup>	1.57 <sup>a</sup>	2.25	2.41	2.26	2.27
VLE (Blackboard, Moodle etc.)	2.71	2.61	2.92 <sup>a</sup>	1.75 <sup>a</sup>	2.43 <sup>a</sup>	2.78 <sup>a</sup>	2.27 <sup>a</sup>	3.20 <sup>a</sup>

\*One-way ANOVA results:

<sup>a</sup>  $p < .001$

<sup>b</sup>  $p < .01$

<sup>c</sup>  $p < .05$

## Conclusions

Gunn et al (2003) concluded from a longitudinal study of gender that:

“It was agreed that gender based access and computer literacy levels among student populations are disappearing problems, and that male and female users generally take different approaches to the use of technology, i.e. exploratory and developmental versus practical and instrumental” (Gunn et al 2003 p27)”.

Our study confirms that there are still gender differences and they still affect issues of ownership and access despite the narrowing gap.

The ECAR studies of US students show that in terms of skills with core applications used for studying that there were few gender differences with males and females reporting similar skill levels for most applications (Salaway et al 2008 p11). The ECAR survey also found that age was a significant factor in terms of the usage of what they describe as communication and collaboration technologies such as text, IM and social networking (ibid p 49). Like the ECAR study we show that gender remain significant for self reported skill levels in some areas but that gender is a less important indicator than age.

Our research suggests that we should be cautious about distinguishing a specific generation because although there are age differences there are additional factors differentiating students, specifically gender and disciplinary differences. We find significant age related differences but we are reluctant to conclude that there is a clear disconnection between a Net generation composed of Digital Natives and older students.

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